Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

DISCUSSION

THE YONKERS WATER SUPPLY AND ITS FUTURE DEVELOPMENT[1]

By D. F. Fulton

Mr. Edward Wegmann: Mr. Fulton has pointed out the difficulties which Yonkers encounters in trying to increase its water supply. The sources which would be suitable for this purpose have been acquired by the city of New York, and Yonkers is, therefore, obliged either to buy the additional quantity of water it requires from New York, at a high price, or to go to a considerable distance for a new supply. Under these circumstances there was nothing left for Yonkers to do but to develop its present sources of water supply to their utmost limit, and to trust that, in the course of time, a metropolitan water board, similar to the one of Boston, Massachusetts, will be created to take charge of the water supply of New York and of the nearby towns and cities.

The manner in which Yonkers intends to increase its present supply has been described fully by Mr. Fulton, and leaves little room for discussion. The only feature of the proposed work which involves difficult construction is the proposed earthen dam, which is to raise the high water level of the Grassy Sprain Reservoir 40 feet. This dam is to be built about 350 feet downstream from the present dyke, and will have a length of about 1070 feet, and a width on top of 24 feet.

If the speaker is correctly informed, the dam will have a height of about 90 feet above the surface, which will place it among the high earthen dams of America. Most engineers will agree that it is more difficult to construct a high dam of earth than of masonry. With the latter material, a leak through the dam causes usually only a loss of water; while with the former material, a leak may lead to the failure of the dam. In order to prevent undermining an earthen dam should be provided with a masonry or puddle corewall, which should be carried down to an impervious stratum.

---

[1] Paper published in Vol. 2, No. 1, March, 1915, *Journal*, pp. 1-8.

At the site selected for the Yonkers dam, rock lies at a distance of about 90 feet below the brook, and as the rock valley is wide, there is a large quantity of material overlying the rock. This material is sand of varying degrees of coarseness, and much of it is so coarse, that water flows freely through it.

It would be very expensive to dig a foundation trench to rock for a corewall through such material. Mr. Fulton states that it has been suggested to obtain a cutoff for the dam "either by driving steel sheet piling to rock, or, in the deeper part of the valley, by sinking a connected series of caissons and filling them with grout or concrete." If the material overlying the rock were uniform, that might possibly be done. But the speaker is told that this material is a glacial drift, containing more or less boulders. It is very doubtful, whether steel sheet piles could be driven 90 feet deep through such material, so as to make a practically watertight cutoff. If caissons were sunk, the work would not only be very expensive, but would involve much difficulty in getting the caissons down vertically to rock, so as to make a tight cutoff. Quicksand or a sliding of the sand, would deflect a caisson from the desired position. At the Hauser Lake dam, caissons for a cofferdam were sunk to a depth of 70 feet, but that was through water. It would evidently be more difficult to sink a caisson through sand, quicksand and boulders to a depth of 90 feet.

In drawing attention to the difficulties that will, doubtless, be encountered in constructing the proposed dam across the Grassy Sprain, at the site selected, the speaker does not wish to imply that this work is impossible, but it will be very expensive, and if it is not done properly may lead to the failure of the dam. The present Grassy Sprain Reservoir has been formed by an earthen dam constructed on similar ground to that at the site of the proposed dam; but it stores only about 50 feet of water, and when the depth of water at the dam is raised to nearly 90 feet undermining of the dam may occur, which would not take place with the lower head.

Many failures of earthen dams have occurred, even when these works were built by good engineers. The terrible diaster caused by the rupture of the Johnstown dam in Pennsylvania is the worst case of this kind that has occurred in America. This dam was 70 feet high. It was ruptured by water flowing over its top, after an unusually heavy rainfall. In England one of the most notable failures of an earthen dam is that of the Dale Dyke dam, which was constructed for the Sheffield Water Works. This structure was 95 feet high by 1254 feet long. It was 12 feet wide on top and about 500 feet wide at the bottom. Both slopes were made 2½ to 1. In the investigations that took place, after the rupture of the dam, the greatest engineers of England testified as experts, but their opinions, as regards what started the failure, varied very much, and this question was never finally settled.